JAN 07 2004
PATENT & TRADEMARK OFFICE

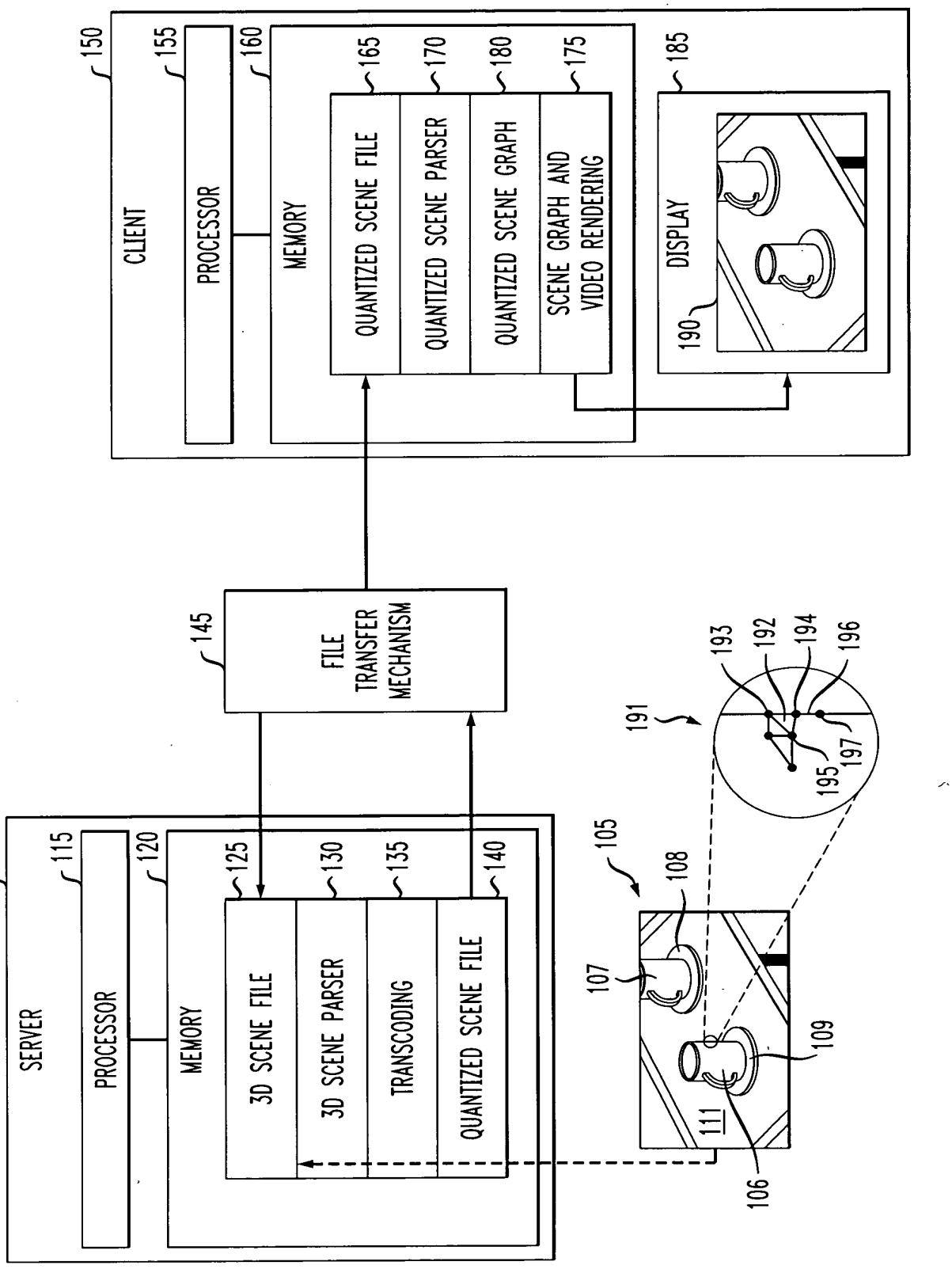


FIG. 1

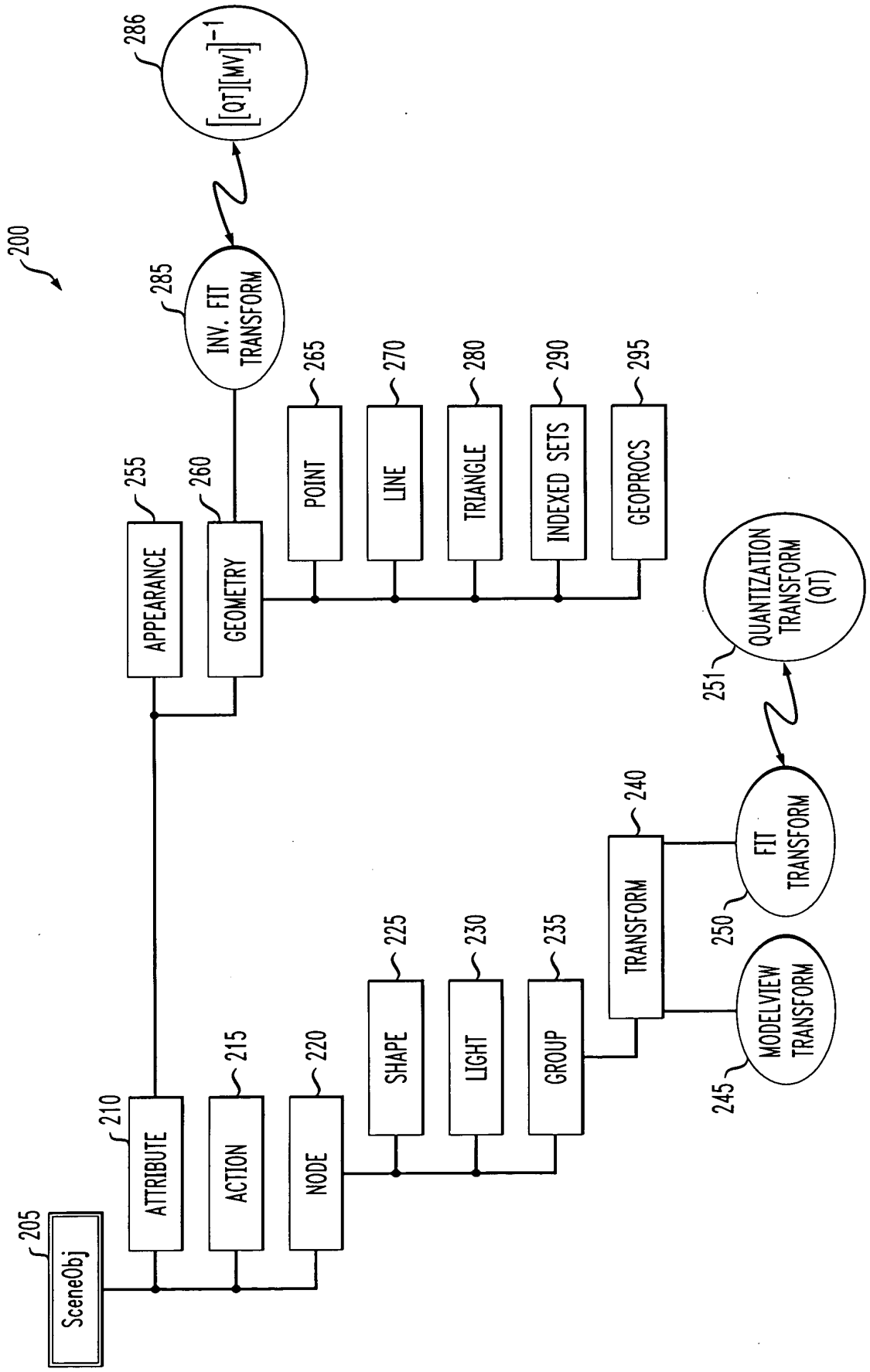
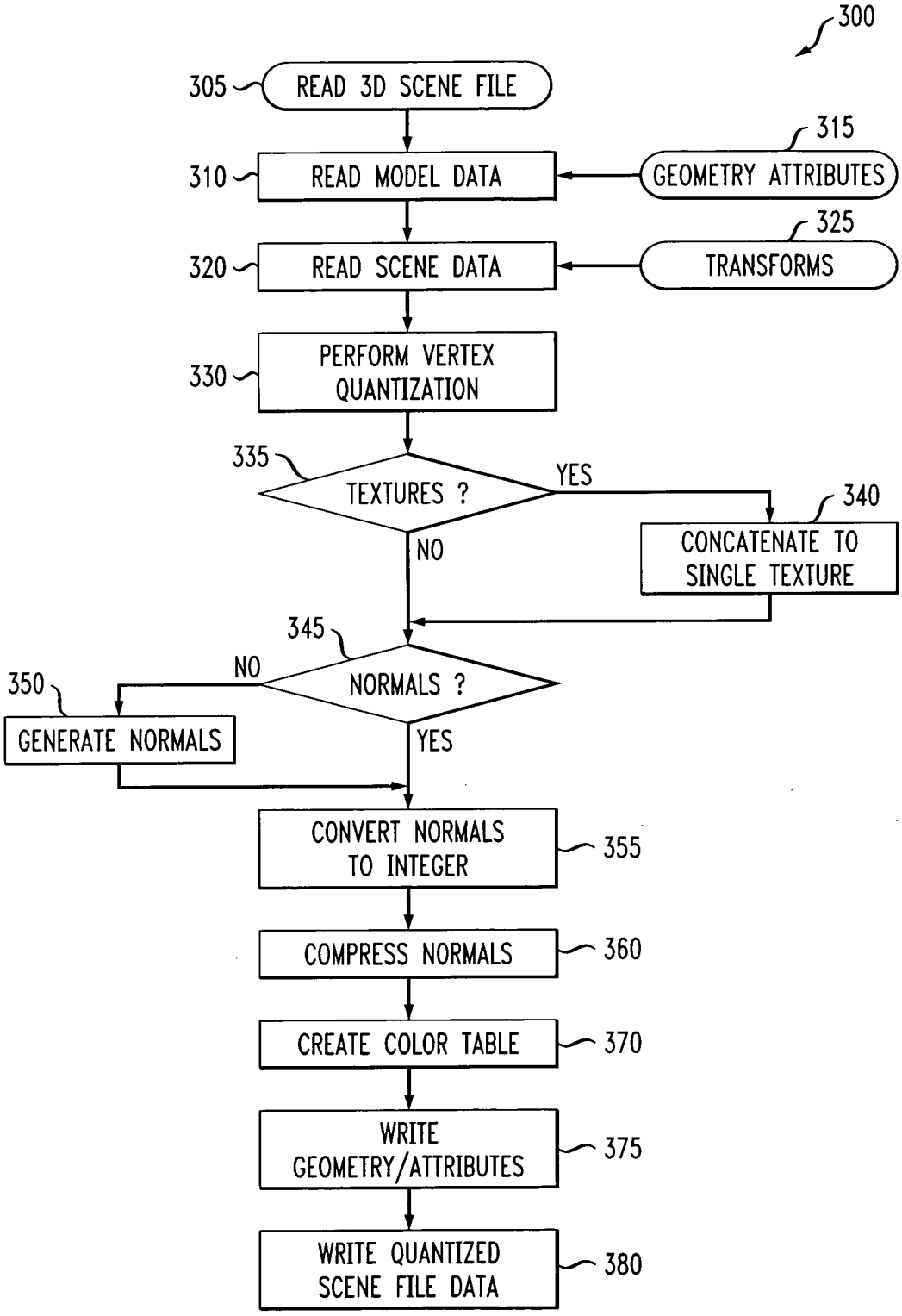

200
205
SceneObj
210
ATTRIBUTE
215
ACTION
220
NODE
225
SHAPE
230
LIGHT
235
GROUP
240
TRANSFORM
245
MODELVIEW TRANSFORM
250
FIT TRANSFORM
251
QUANTIZATION TRANSFORM (QT)
255
APPEARANCE
260
GEOMETRY
265
POINT
270
LINE
280
TRIANGLE
290
INDEXED SETS
295
GEOPROCS
285
INV. FIT TRANSFORM
286
$[[QT][MV]]^{-1}$

FIG. 2

FIG. 3


300
305
READ 3D SCENE FILE
315
310
READ MODEL DATA
GEOMETRY ATTRIBUTES
325
320
READ SCENE DATA
TRANSFORMS
330
PERFORM VERTEX QUANTIZATION
335
TEXTURES ?
YES
340
CONCATENATE TO SINGLE TEXTURE
NO
345
NO
350
NORMALS ?
GENERATE NORMALS
YES
CONVERT NORMALS TO INTEGER
355
COMPRESS NORMALS
360
CREATE COLOR TABLE
370
WRITE GEOMETRY/ATTRIBUTES
375
WRITE QUANTIZED SCENE FILE DATA
380

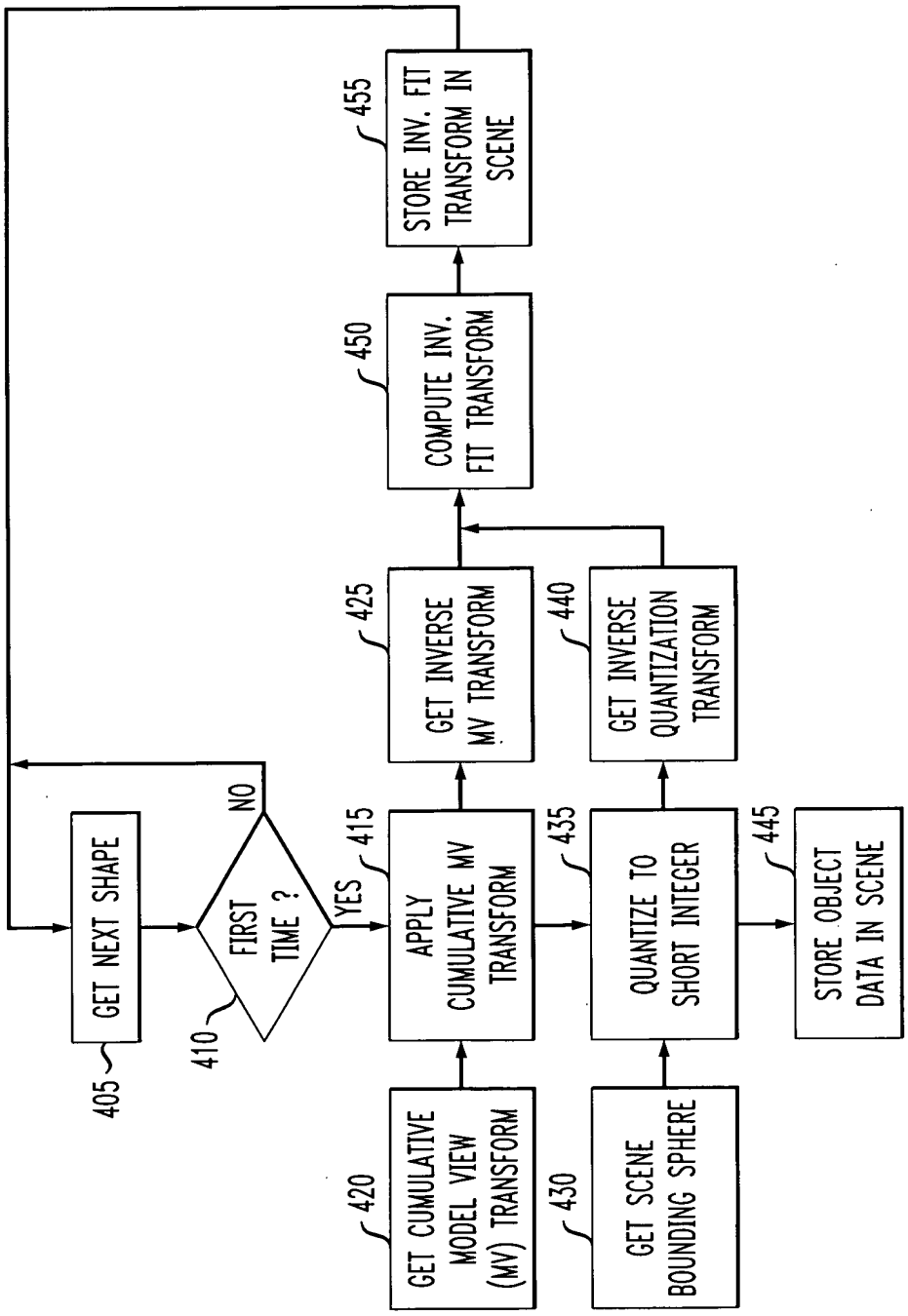

330
GET NEXT SHAPE
405
FIRST TIME ?
410
NO
YES
APPLY CUMULATIVE MV TRANSFORM
415
GET CUMULATIVE MODEL VIEW (MV) TRANSFORM
420
GET INVERSE MV TRANSFORM
425
COMPUTE INV. FIT TRANSFORM
450
STORE INV. FIT TRANSFORM IN SCENE
455
GET SCENE BOUNDING SPHERE
430
QUANTIZE TO SHORT INTEGER
435
GET INVERSE QUANTIZATION TRANSFORM
440
STORE OBJECT DATA IN SCENE
445

FIG. 4A

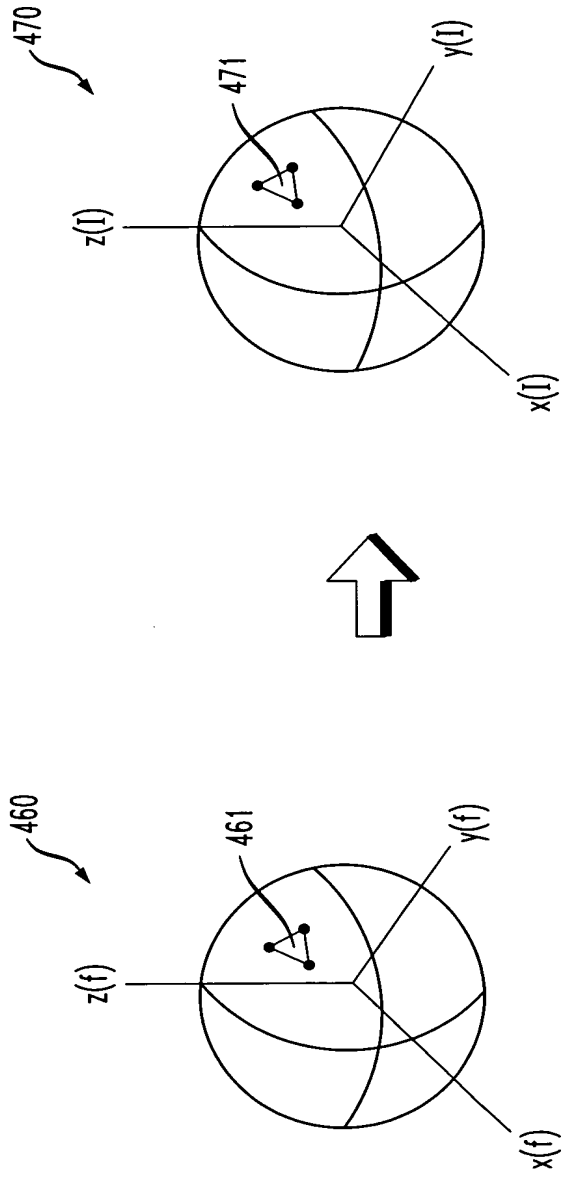


FIG. 4B

FIG. 5

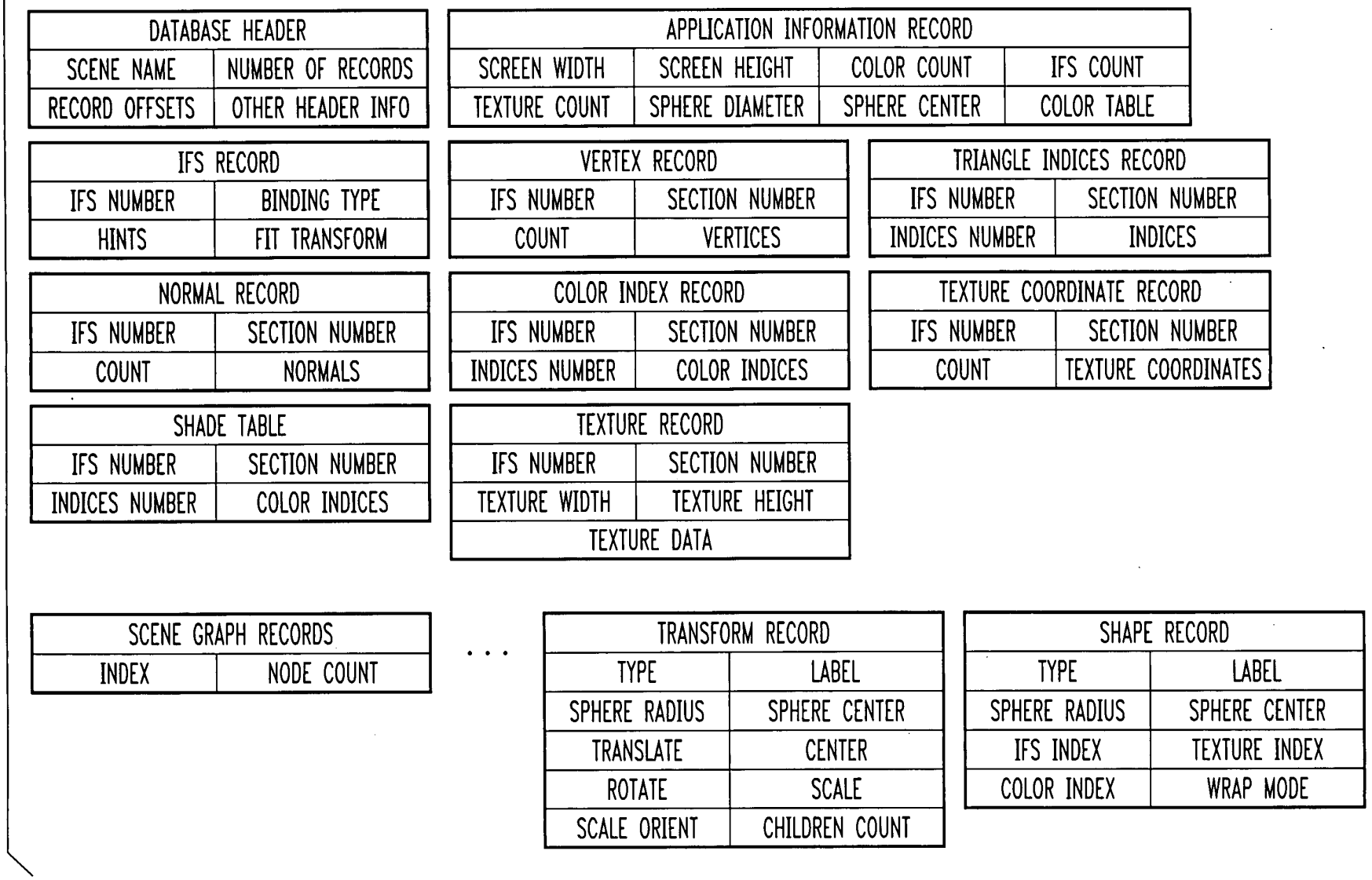
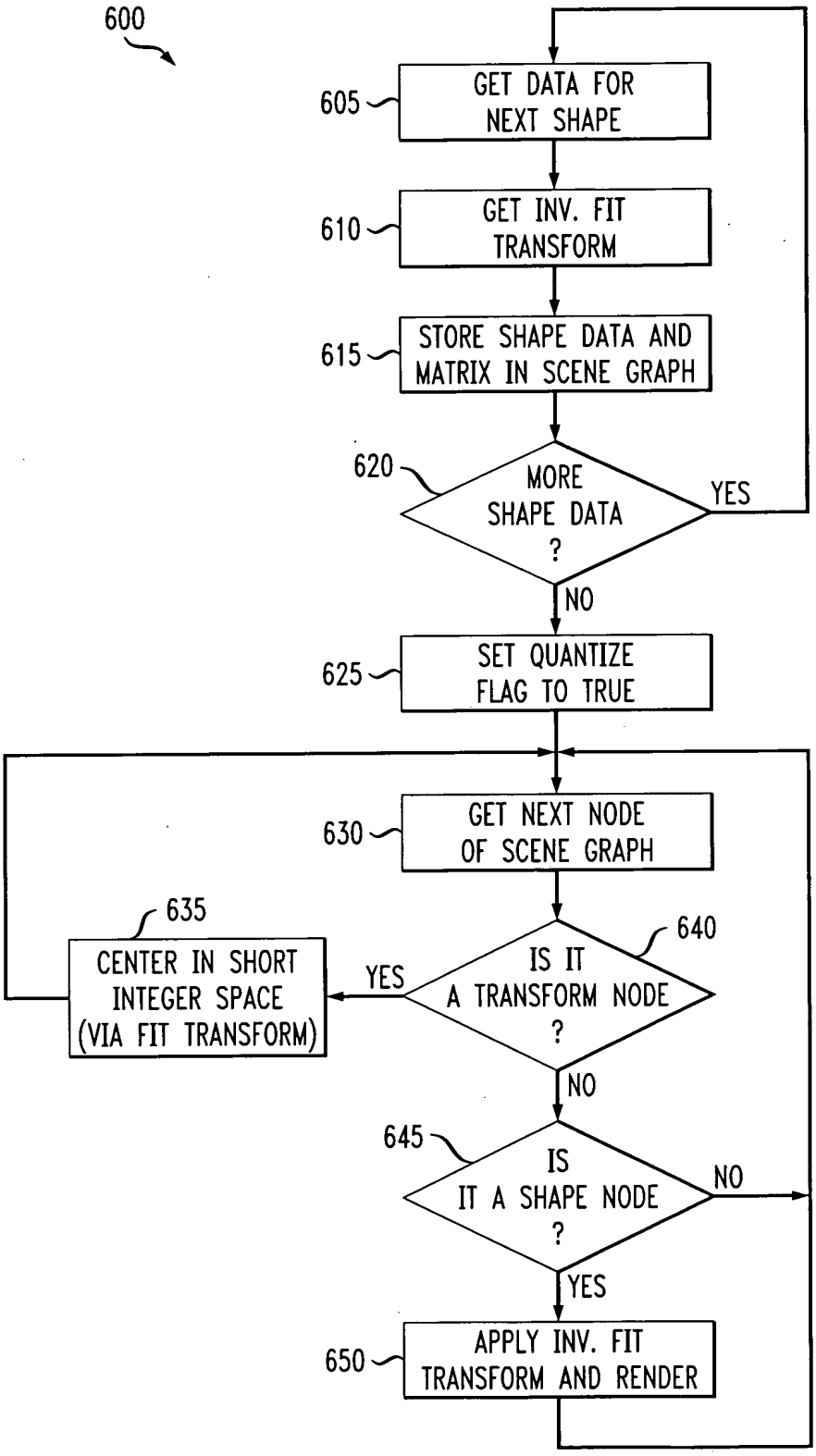

DATABASE HEADER
SCENE NAME
NUMBER OF RECORDS
RECORD OFFSETS
OTHER HEADER INFO
APPLICATION INFORMATION RECORD
SCREEN WIDTH
SCREEN HEIGHT
COLOR COUNT
IFS COUNT
TEXTURE COUNT
SPHERE DIAMETER
SPHERE CENTER
COLOR TABLE
IFS RECORD
IFS NUMBER
BINDING TYPE
HINTS
FIT TRANSFORM
VERTEX RECORD
IFS NUMBER
SECTION NUMBER
COUNT
VERTICES
TRIANGLE INDICES RECORD
IFS NUMBER
SECTION NUMBER
INDICES NUMBER
INDICES
NORMAL RECORD
IFS NUMBER
SECTION NUMBER
COUNT
NORMALS
COLOR INDEX RECORD
IFS NUMBER
SECTION NUMBER
INDICES NUMBER
COLOR INDICES
TEXTURE COORDINATE RECORD
IFS NUMBER
SECTION NUMBER
COUNT
TEXTURE COORDINATES
SHADE TABLE
IFS NUMBER
SECTION NUMBER
INDICES NUMBER
COLOR INDICES
TEXTURE RECORD
IFS NUMBER
SECTION NUMBER
TEXTURE WIDTH
TEXTURE HEIGHT
TEXTURE DATA
SCENE GRAPH RECORDS
INDEX
NODE COUNT
. . .
TRANSFORM RECORD
TYPE
LABEL
SPHERE RADIUS
SPHERE CENTER
TRANSLATE
CENTER
ROTATE
SCALE
SCALE ORIENT
CHILDREN COUNT
SHAPE RECORD
TYPE
LABEL
SPHERE RADIUS
SPHERE CENTER
IFS INDEX
TEXTURE INDEX
COLOR INDEX
WRAP MODE

FIG. 6


600
605
GET DATA FOR NEXT SHAPE
610
GET INV. FIT TRANSFORM
615
STORE SHAPE DATA AND MATRIX IN SCENE GRAPH
620
MORE SHAPE DATA ?
YES
NO
625
SET QUANTIZE FLAG TO TRUE
630
GET NEXT NODE OF SCENE GRAPH
635
CENTER IN SHORT INTEGER SPACE (VIA FIT TRANSFORM)
640
IS IT A TRANSFORM NODE ?
YES
NO
645
IS IT A SHAPE NODE ?
NO
YES
650
APPLY INV. FIT TRANSFORM AND RENDER